Claims

What Is Claimed Is:

1. A method for fabricating a thermal bubble inkjet head equipped with a symmetrical off-shooter heater comprising the steps of:

providing a silicon substrate having a top surface and a bottom surface;

forming a first and a second insulating material layer of at least 1000Å thick on said top and bottom surfaces;

reactive ion etching an opening for a manifold in said second insulating material layer on said bottom surface;

wet etching a funnel-shaped manifold in said silicon substrate;

forming a symmetrical ring-shaped heater on said first insulating material layer on said top surface;

depositing and patterning an interconnect with a conductive metal in electrical communication with said ring-shaped heater;

depositing a third insulating material layer on top of said ring-shaped heater and said first insulating material layer;

spin-coating a first photoresist layer of at least 2000Å thick on top of said third insulating material layer;

patterning by UV exposure an ink chamber in said first photoresist layer;

depositing a metal seed layer on said first photoresist layer and patterning an inkjet orifice in said metal seed layer;

spin-coating a second photoresist layer of at least 2000Å thick on said metal seed layer and patterning said inkjet orifice;

removing said developed second photoresist layer except on top of said inkjet orifice;

electroplating Ni on top of said metal seed layer encapsulating said second photoresist layer on top of said inkjet orifice;

stripping away said second photoresist layer on top of said inkjet orifice;

reactive ion etching away said second insulating material layer on said bottom surface of the silicon substrate and said first insulating material layer exposed in said manifold; and

stripping away said first photoresist layer from said ink chamber.

2. A method for fabricating a thermal bubble inkjet head equipped with a symmetrical heater according to claim 1 further comprising the step of forming said first and second insulating material layers by either SiO_2 or Si_3N_4.

3. A method for fabricating a thermal bubble inkjet head equipped with a symmetrical heater according to claim 1 further comprising the step of wet etching a funnel-shaped manifold in said silicon substrate by KOH.

4. A method for fabricating a thermal bubble inkjet head equipped with a symmetrical heater according to claim 1 further comprising the step of forming said symmetrical ring-shaped heater with TaAl.

5. A method for fabricating a thermal bubble inkjet head equipped with a symmetrical heater according to claim 1 further comprising the step of depositing said third insulating material layer of Si_3N_4 or SiC.

6. A method for fabricating a thermal bubble inkjet head equipped with a symmetrical heater according to claim 1 further comprising the step of spin-coating a first photoresist layer preferably of at least 5000Å thick.

7. A method for fabricating a thermal bubble inkjet head equipped with a symmetrical heater according to claim 1 further comprising the step of depositing said metal seed layer of Cr and Ni.

8. A method for fabricating a thermal bubble inkjet head equipped with a symmetrical heater according to claim 1 further comprising the step of stripping away said second photoresist layer by a wet etching method.

9. A method for fabricating a thermal bubble inkjet head equipped with a symmetrical heater according to claim 1 further comprising the step of stripping away said first photoresist layer from said chamber by a wet etching technique.

10. A method for fabricating a thermal bubble inkjet head equipped with a symmetrical heater according to claim 1 further comprising the step of patterning said inkjet orifice in said metal seed layer adjacent to said ring-shaped heater.

11. A thermal bubble inkjet head having a symmetrical off-shooter heater comprising:

a silicon substrate having a top surface and a bottom surface;

a first and a second insulating material layer of at least 1000Å thick on said top and bottom surfaces;

a funnel-shaped manifold formed in said second insulating material layer and said silicon substrate;

a symmetrical ring-shaped heater formed on said first insulating material layer on said top surface;

an interconnect formed of a conductive metal in electrical communication with said ring-shaped heater;

a third insulating material layer on top of said ring-shaped heater and said first insulating material layer;

a first photoresist layer of at least 2000Å thick on top of said third insulating material layer;

an ink chamber formed in said first photoresist layer in fluid communication with said funnel-shaped manifold;

a metal seed layer on said first photoresist layer and an inkjet orifice formed in said metal seed layer; and

a Ni layer on top of said metal seed layer with an aperture formed therein in fluid communication with said inkjet orifice.

12. A thermal bubble inkjet head having a symmetrical heater according to claim 11, wherein said first photoresist layer preferably has a thickness of at least 5000Å.

13. A thermal bubble inkjet head having a symmetrical heater according to claim 11, wherein said inkjet orifice is formed in close proximity to said symmetrical ring-shaped heater.

14. A thermal bubble inkjet head having a symmetrical heater according to claim 11, wherein said first and second insulating material layers are a SiO_2 layer or a Si_3N_4 layer.

15. A thermal bubble inkjet head having a symmetrical heater according to claim 11, wherein said symmetrical ring-shaped heater is formed of TaAl.

16. A thermal bubble inkjet head having a symmetrical heater according to claim 11, wherein said metal seed layer is deposited of Cr or Ni.

17. A thermal bubble inkjet head having a symmetrical heater according to claim 11, wherein said ring-shaped heater is positioned juxtaposed to said inkjet orifice.

18. A thermal bubble inkjet head having a symmetrical heater according to claim 11, wherein said ring-shaped heater is positioned in said ink chamber.

19. A thermal bubble inkjet head having a symmetrical heater according to claim 18, wherein said inkjet orifice is formed in said ink chamber opposite to said ring-shaped heater.

64,600-091
900037-1

20. A thermal bubble inkjet head having a symmetrical heater according to claim 11, wherein said inkjet head is a monolithic head.